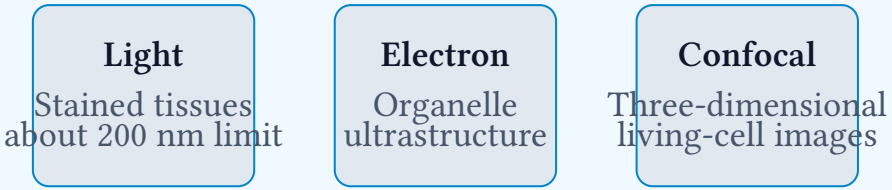
Science 10

Unit C: Cycling of matter in living systems

Microscopy and modern cell research

One specimen under different microscopes

- A light microscope can show whole cells and some living processes.
- Electron and confocal microscopes reveal different details because they use different signals and preparation methods.



Information in an image

- Images depend on preparation, staining, signal detection, scale, and instrument limits.
- Resolution, living-sample needs, depth, preparation, and the structure being studied require different methods.
- Choose a method for its resolution, whether the sample can stay alive, and the structure you need to see.

Key terms

resolution

The ability to distinguish two close points as separate.

magnification

How many times larger an image appears than the object.

electron microscope

A microscope that uses electrons to image structures at high resolution.

confocal microscopy

Optical imaging that collects thin focal sections to build detailed three-dimensional views.

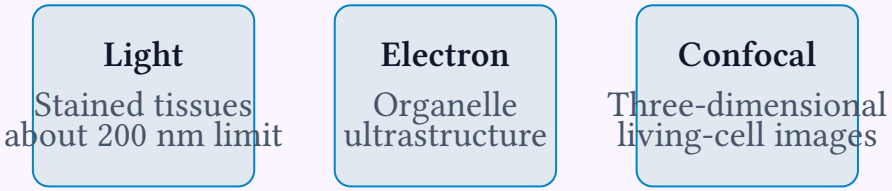
Key terms

stain

A substance or marker used to increase contrast or identify structures.

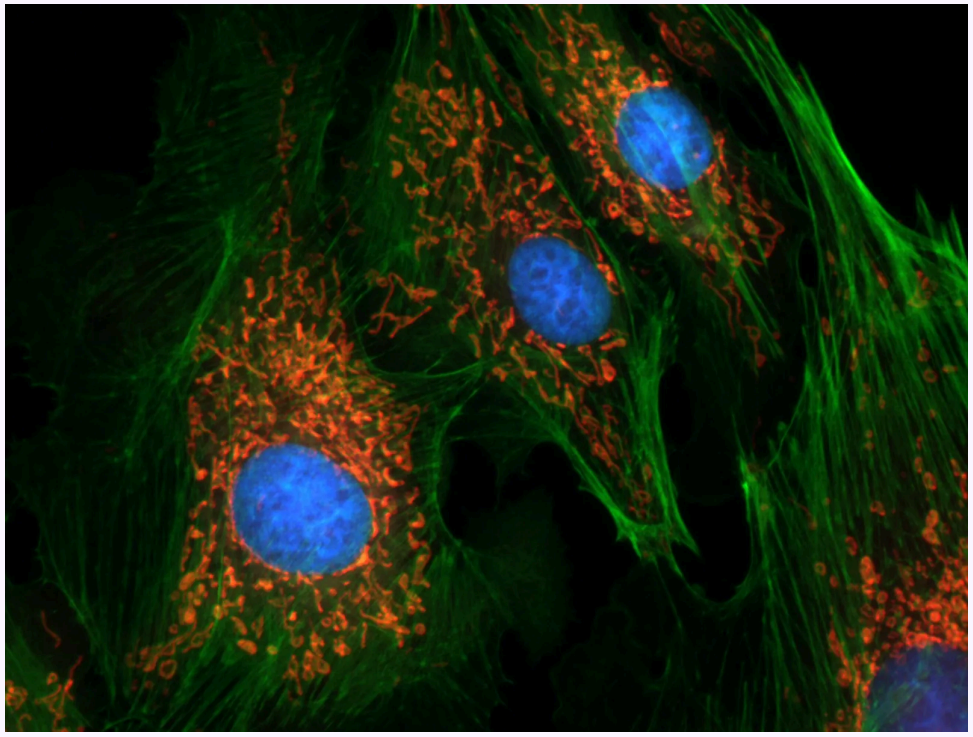
Imaging technology

- A light microscope, an electron microscope, and a confocal laser scanning microscope answer different questions.
- A stain can make a structure visible that would otherwise blend into the background.
- Pick the instrument that gives the evidence you need. The biggest magnification number is only one factor.



Molecular research

- A micrograph shows where something is. Proving what that structure does takes further evidence.
- Fluorescent labels, gene maps, and transport-rate experiments add the molecular evidence.
- Controls are how you tell a real signal from a preparation artifact.
- Imaging and molecular tests answer different questions.



Choosing an instrument

- Select an imaging method for three research questions and justify each selection.
- A complete answer mentions resolution, living samples, depth, or the structure being studied, as well as magnification.

Image credits

Erin Rod, Bovine Pulmonary Artery Endothelial Cells Fluorescent Image, CC BY 4.0